

### **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the present application.

#### **Listing of Claims:**

##### **Claim 1 (canceled)**

**Claim 2 (currently amended):** A method of manufacturing *n*-type semiconductor diamond, the method employing an ion-implantation apparatus having an electron-beam line and *Li* and *N* ion-beam lines, and the method comprising:

a preparatory step of providing single-crystal Type IIa or undoped epitaxial diamond essentially not containing impurities;

an implantation step of producing diamond incorporating *Li* and *N* by irradiating the diamond with the *Li* and *N* ion-beam lines simultaneously and in such a manner as to implanting into single-crystal Type IIa or undoped epitaxial the diamond essentially not containing impurities *Li* ions at a dose of at least  $3.0 \times 10^{15} \text{ cm}^{-2}$ [[,]] and *N* ions at a dose such that the *Li* and *N* sum-total dose is at least  $7.0 \times 10^{15} \text{ cm}^{-2}$ , and so that ion-implantation depths at which the post-implantation *Li* and *N* concentrations each are at least 1600 ppm will overlap;

an irradiation step, concurrent with said implantation step, of irradiating the diamond with the electron beam to cause the implantation *Li* and *N* ions to distribute in locations within the diamond in which *Li-N* pairing is likely to occur; and

a step of annealing said diamond incorporating *Li* and *N* at a temperature in the range of from 800°C to less than 1800°C, under high-pressure conditions of at least 3 GPa so as to cause *Li* and *N* pairing to occur to the exclusion of *Li* associating

with implantation-caused vacancies in the diamond, such that the  $Li-N$  pairs do not associate with vacancies but instead become electrically activated shallow donors;

whereby said diamond has a sheet resistance of not greater than  $1.4 \times 10^4$

$\Omega/\square$ .

**Claims 3 through 5: (canceled)**

**Claim 6 (currently amended):** Semiconductor diamond manufactured by the  $n$ -type semiconductor-diamond manufacturing method set forth in claim 2 ~~being Type IIa, single crystal or undoped epitaxial  $n$  type, incorporating, from a crystal face thereof to the same depth, at least 1600 ppm of each of  $Li$  and  $N$ , and having a sheet resistance of not greater than  $1.4 \times 10^4 \Omega/\square$ .~~

**Claims 7-9 (canceled)**